Download Dynamic Programming And Stochastic Control Volume 125 Mathematics In Science And Engineering

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**Dynamic Programming and Stochastic Control**

- Bertsekas - 1976-11-26
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Optimization Over Time, Dynamic Programming and Stochastic Control - Peter Whittle - 1982

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Dynamic Programming and Optimal Control - Dimitri Bertsekas -
This is the leading and most up-to-date textbook on the far-ranging algorithmic methodology of Dynamic Programming, which can be used for optimal control, Markovian decision problems, planning and sequential decision making under uncertainty, and discrete/combinatorial optimization. The treatment focuses on basic unifying themes, and conceptual foundations. It illustrates the versatility, power, and generality of the method with many examples and applications from engineering, operations research, and other fields. It also addresses extensively the practical application of the methodology, possibly through the use of approximations, and provides an extensive treatment of the far-reaching methodology of Neuro-Dynamic Programming/Reinforcement Learning. Among its special features, the book 1) provides a unifying framework for sequential decision making, 2) treats simultaneously deterministic and stochastic control problems popular in modern control theory and Markovian decision popular in operations research, 3) develops the theory of deterministic optimal control problems including the Pontryagin Minimum Principle, 4) introduces recent suboptimal control and simulation-based approximation techniques (neuro-dynamic programming), which allow the practical
applications from engineering, operations problems that involve the dual curse of large dimension and lack of an accurate mathematical model, 5) provides a comprehensive treatment of infinite horizon problems in the second volume, and an introductory treatment in the first volume. The electronic version of the book includes 29 theoretical problems, with high-quality solutions, which enhance the range of coverage of the book.

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terminal time of its evolution, control-stopping infinite horizon problems in the second volume, and an introductory treatment in the first volume. The electronic version of the book includes 29 theoretical problems, with high-quality solutions, which enhance the range of coverage of the book.

**Stochastic Control Theory** - Makiko Nisio - 2014-11-27

This book offers a systematic introduction to the optimal stochastic control theory via the dynamic programming principle, which is a powerful tool to analyze control problems. First we consider completely observable control problems with finite horizons. Using a time discretization we construct a nonlinear semigroup related to the dynamic programming principle (DPP), whose generator provides the Hamilton–Jacobi–Bellman (HJB) equation, and we characterize the value function via the nonlinear semigroup, besides the viscosity solution theory. When we control not only the dynamics of a system but also the problems arise. This problem is treated in the same frameworks, via the nonlinear semigroup. Its results are applicable to the American option price problem. Zero-sum two-player time-homogeneous stochastic differential games and viscosity solutions of the Isaacs equations arising from such games are studied via a nonlinear semigroup related to DPP (the min-max principle, to be precise). Using semi-discretization arguments, we construct the nonlinear semigroups whose generators provide lower and upper Isaacs equations. Concerning partially observable control problems, we refer to stochastic parabolic equations driven by colored Wiener noises, in particular, the Zakai equation. The existence and uniqueness of solutions and regularities as well as Itô's formula are stated. A control problem for the Zakai equations has a nonlinear semigroup whose generator provides the HJB equation on a Banach space. The value function turns out to be a unique viscosity
completely observable control problems with conditions. This edition provides a more generalized treatment of the topic than does the earlier book Lectures on Stochastic Control Theory (ISI Lecture Notes 9), where time-homogeneous cases are dealt with. Here, for finite time-horizon control problems, DPP was formulated as a one-parameter nonlinear semigroup, whose generator provides the HJB equation, by using a time-discretization method. The semigroup corresponds to the value function and is characterized as the envelope of Markovian transition semigroups of responses for constant control processes. Besides finite time-horizon controls, the book discusses control-stopping problems in the same frameworks.

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**Stochastic Optimal Control in Infinite Dimension** - Giorgio Fabbri - 2017-06-22

Providing an introduction to stochastic optimal control in infinite dimension, this book gives a complete account of the theory of second-order HJB equations in infinite-dimensional Hilbert spaces, focusing on its applicability to associated stochastic optimal control problems. It features a general introduction to optimal stochastic control, including basic results (e.g. the dynamic programming principle) with proofs, and provides examples of applications. A complete and up-to-date exposition of the existing theory of viscosity solutions and regular solutions of second-order HJB equations in Hilbert spaces is given, together with an extensive survey of other methods, with a full bibliography. In particular, Chapter 6, written by M. Fuhrman and G. Tessitore, surveys the theory of regular solutions
general introduction to optimal stochastic stochastic control, via BSDEs. The book is of interest to both pure and applied researchers working in the control theory of stochastic PDEs, and in PDEs in infinite dimension. Readers from other fields who want to learn the basic theory will also find it useful. The prerequisites are: standard functional analysis, the theory of semigroups of operators and its use in the study of PDEs, some knowledge of the dynamic programming approach to stochastic optimal control problems in finite dimension, and the basics of stochastic analysis and stochastic equations in infinite-dimensional spaces.

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**Dynamic Programming and Optimal Control**
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**Optimal Stochastic Control, Stochastic Target Problems, and Backward SDE** - Nizar Touzi - 2012-09-25

This book collects some recent developments in stochastic control theory with applications to financial mathematics. We first address standard stochastic control problems from the viewpoint of the recently developed weak dynamic programming principle. A special emphasis is put on the regularity issues and, in particular, on the behavior of the value function near the boundary. We then provide a quick review of the main tools from viscosity solutions which allow to overcome class of stochastic target problems which extends in a nontrivial way the standard stochastic control problems. Here the theory of viscosity solutions plays a crucial role in the derivation of the dynamic programming equation as the infinitesimal counterpart of the corresponding geometric dynamic programming equation. The various developments of this theory have been stimulated by applications in finance and by relevant connections with geometric flows. Namely, the second order extension was motivated by illiquidity modeling, and the controlled loss version was introduced following the problem of quantile hedging. The third part specializes to an overview of Backward stochastic differential equations, and their extensions to the quadratic case.

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**Optimization Over Time** - Peter Whittle - 1981

**Stochastic Controls** - Jiongmin Yong - 2012-12-06

As is well known, Pontryagin's maximum principle and Bellman's dynamic programming are the two principal and most commonly used approaches in solving stochastic optimal control problems. An interesting phenomenon one can observe from the literature is that these two approaches have been developed separately and independently. Since both methods are used to investigate the same problems, a natural question one will ask is the following: (Q) What is the relationship between the maximum
Stochastic Controls - Jiongmin Yong -

Stochastic optimal controls? There did exist some researches (prior to the 1980s) on the relationship between these two. Nevertheless, the results usually were stated in heuristic terms and proved under rather restrictive assumptions, which were not satisfied in most cases. In the statement of a Pontryagin-type maximum principle there is an adjoint equation, which is an ordinary differential equation (ODE) in the (finite-dimensional) deterministic case and a stochastic differential equation (SDE) in the stochastic case. The system consisting of the adjoint equation, the original state equation, and the maximum condition is referred to as an (extended) Hamiltonian system. On the other hand, in Bellman's dynamic programming, there is a partial differential equation (PDE), of first order in the (finite-dimensional) deterministic case and of second or der in the stochastic case. This is known as a Hamilton-Jacobi-Bellman (HJB) equation.

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**Dynamic Programming and Optimal Control**
- Dimitri P. Bertsekas - 1995-01-01

**Continuous-time Stochastic Control and Optimization with Financial Applications**
- Huyên Pham - 2009-05-28
etc. This book is directed towards graduate methods in finance.

**Continuous-time Stochastic Control and Optimization with Financial Applications** - Huyên Pham - 2009-05-28

Stochastic optimization problems arise in decision-making problems under uncertainty, and find various applications in economics and finance. On the other hand, problems in finance have recently led to new developments in the theory of stochastic control. This volume provides a systematic treatment of stochastic optimization problems applied to finance by presenting the different existing methods: dynamic programming, viscosity solutions, backward stochastic differential equations, and martingale duality methods. The theory is discussed in the context of recent developments in this field, with complete and detailed proofs, and is illustrated by means of concrete examples from the world of finance: portfolio allocation, option hedging, real options, optimal investment, students and researchers in mathematical finance, and will also benefit applied mathematicians interested in financial applications and practitioners wishing to know more about the use of stochastic optimization methods in finance.

**Dynamic Programming and Stochastic Control Processes** - Richard Bellman - 1958

It is shown how the functional equation technique of dynamic programming may be used to obtain a new computational and analytic approach to variational problems. The limited memory capacity of present-day digital computers limits the successful application of these techniques to first and second order systems at the moment, with limited application to higher order systems.

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Optimization Over Time. Dynamic Programming and Stochastic Control Vol. 2 - Peter Whittle - 1983

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Reinforcement Learning and Optimal Control - Dimitri Bertsekas - 2019-07-01
This book considers large and challenging multistage decision problems, which can be solved in principle by dynamic programming (DP), but their exact solution is computationally intractable. We discuss solution methods that rely on approximations to produce suboptimal policies with adequate performance. These methods are collectively known by several essentially equivalent names: reinforcement learning, approximate dynamic programming, neuro-dynamic programming. They have been at the forefront of research for the last 25 years, and they underlie, among others, the recent impressive successes of self-learning in the context of games such as chess and Go. Our subject has benefited greatly from the interplay of ideas from optimal control and from artificial intelligence, as it relates to reinforcement learning and simulation-based neural network methods. One of the aims of the book is to explore the common boundary between these two fields and to form a bridge that is accessible by workers with background in either field. Another aim is to organize coherently the broad mosaic of methods that have proved successful in practice while having a solid theoretical and/or
numbers and stochastic convergence are and practitioners to find their way through the maze of competing ideas that constitute the current state of the art. This book relates to several of our other books: Neuro-Dynamic Programming (Athena Scientific, 1996), Dynamic Programming and Optimal Control (4th edition, Athena Scientific, 2017), Abstract Dynamic Programming (2nd edition, Athena Scientific, 2018), and Nonlinear Programming (Athena Scientific, 2016). However, the mathematical style of this book is somewhat different. While we provide a rigorous, albeit short, mathematical account of the theory of finite and infinite horizon dynamic programming, and some fundamental approximation methods, we rely more on intuitive explanations and less on proof-based insights. Moreover, our mathematical requirements are quite modest: calculus, a minimal use of matrix-vector algebra, and elementary probability (mathematically complicated arguments involving laws of large bypassed in favor of intuitive explanations). The book illustrates the methodology with many examples and illustrations, and uses a gradual expository approach, which proceeds along four directions: (a) From exact DP to approximate DP: We first discuss exact DP algorithms, explain why they may be difficult to implement, and then use them as the basis for approximations. (b) From finite horizon to infinite horizon problems: We first discuss finite horizon exact and approximate DP methodologies, which are intuitive and mathematically simple, and then progress to infinite horizon problems. (c) From deterministic to stochastic models: We often discuss separately deterministic and stochastic problems, since deterministic problems are simpler and offer special advantages for some of our methods. (d) From model-based to model-free implementations: We first discuss model-based implementations, and then we identify schemes that can be appropriately modified to work with a
methods are collectively known by several by the companion research monograph Rollout, Policy Iteration, and Distributed Reinforcement Learning (Athena Scientific, 2020), which focuses more closely on several topics related to rollout, approximate policy iteration, multiagent problems, discrete and Bayesian optimization, and distributed computation, which are either discussed in less detail or not covered at all in the present book. The author's website contains class notes, and a series of videolectures and slides from a 2021 course at ASU, which address a selection of topics from both books.

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**Stochastic Dynamic Programming and the Control of Queueing Systems** - Linn I. Sennott
- 2009-09-25

A path-breaking account of Markov decision processes-theory and computation This book's clear presentation of theory, numerous chapter-end problems, and development of a unified method for the computation of optimal policies in both discrete and continuous time make it an excellent course text for graduate students and advanced undergraduates. Its comprehensive coverage of important recent advances in

valuable working resource for operations research professionals, management scientists, engineers, and others. Stochastic Dynamic Programming and the Control of Queueing Systems presents the theory of optimization under the finite horizon, infinite horizon discounted, and average cost criteria. It then shows how optimal rules of operation (policies) for each criterion may be numerically determined. A great wealth of examples from the application area of the control of queueing systems is presented. Nine numerical programs for the computation of optimal policies are fully explicated. The Pascal source code for the programs is available for viewing and downloading on the Wiley Web site at www.wiley.com/products/subject/mathematics. The site contains a link to the author's own Web site and is also a place where readers may discuss developments on the programs or other aspects of the material. The source files are also
both discrete and continuous time make it an excellent course text for graduate students and advanced undergraduates. Its comprehensive coverage of important recent advances in stochastic dynamic programming makes it a valuable working resource for operations research professionals, management scientists, engineers, and others. Stochastic Dynamic Programming and the Control of Queueing Systems presents the theory of optimization under the finite horizon, infinite horizon discounted, and average cost criteria. It then shows how optimal rules of operation (policies) for each criterion may be numerically determined. A great wealth of examples from the application area of the control of queueing systems is presented. Nine numerical programs for the computation of optimal policies are fully explicated. The Pascal source code for the programs is available for viewing and downloading on the Wiley Web site at

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This research monograph, first published in 1978 by Academic Press, remains the authoritative and comprehensive treatment of the mathematical foundations of stochastic optimal control of discrete-time systems, including the treatment of the intricate measure-theoretic issues. It is an excellent supplement to the first author's Dynamic Programming and Optimal Control (Athena Scientific, 2018). Review of the 1978 printing: "Bertsekas and Shreve have written a fine book. The exposition is extremely clear and a helpful introductory chapter provides orientation and a guide to the rather intimidating mass of literature on the subject. Apart from anything else, the book serves as an excellent introduction to the arcane world of analytic sets and other lesser known byways of measure theory." Mark H. A. Davis, Imperial College, in IEEE Trans. on Automatic Control Among its special features, the book: 1) Resolves definitively the mathematical issues of discrete-time stochastic optimal control problems, including Borel

Stochastic Optimal Control: The Discrete-Time Case - Dimitri P. Bertsekas - 1996-12-01
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Abstract Dynamic Programming - Dimitri Bertsekas - 2022-01-01
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problem's structure is largely inconsequential. New research is focused on two areas: 1) The ramifications of these properties in the context of algorithms for approximate DP, and 2) The new class of semicontractive models, exemplified by stochastic shortest path problems, where some but not all policies are contractive. The 3rd edition is very similar to the 2nd edition, except for the addition of a new chapter (Chapter 5), which deals with abstract DP models for sequential minimax problems and zero-sum games, The book is an excellent supplement to several of our books: Neuro-Dynamic Programming (Athena Scientific, 1996), Dynamic Programming and Optimal Control (Athena Scientific, 2017), Reinforcement Learning and Optimal Control (Athena Scientific, 2019), and Rollout, Policy Iteration, and Distributed Reinforcement Learning (Athena Scientific, 2020).

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**Optimization Over Time** - Peter Whittle - 1982

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Dynamic Programming and Its Application to Optimal Control - - 1971-10-11
In this book, we study theoretical and practical aspects of computing methods for mathematical modelling of nonlinear systems. A number of computing techniques are considered, such as methods of operator approximation with any given accuracy; operator interpolation techniques including a non-Lagrange interpolation; methods of system representation subject to constraints associated with concepts of causality, memory and stationarity; methods of system representation with an accuracy that is the best within a given class of models; methods of covariance matrix estimation; methods for low-rank matrix approximations; hybrid methods based on a combination of iterative procedures and best operator approximation; and methods for information compression and filtering under condition that a filter model should satisfy restrictions associated with causality and different types of memory. As a result, the book represents a blend of new methods in general computational analysis, and specific, but also generic, techniques for study of systems theory and its particular branches, such as optimal filtering and information compression. - Best operator approximation, - Non-Lagrange interpolation, - Generic Karhunen-Loeve transform - Generalised low-rank matrix approximation - Optimal data compression - Optimal nonlinear filtering

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Control of uncertain systems over a finite horizon; Control of uncertain systems over an infinite horizon.

Dynamic Programming and Stochastic Control - Dimitri P. Bertsekas - 1976

Dynamic Programming and Optimal Stochastic Control - Frank Tze-pa Lee - 1973

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Stable Linear Approximations to Dynamic Programming for Stochastic Control Problems with Local Transitions - Benjamin Van Roy - 1996

Stable Linear Approximations to Dynamic Programming for Stochastic Control
Since its origins in the 1940s, the subject of decision making under uncertainty has grown into a diversified area with application in several branches of engineering and in those areas of the social sciences concerned with policy analysis and prescription. These approaches required a computing capacity too expensive for the time, until the ability to collect and process huge quantities of data engendered an explosion of work in the area. This book provides succinct and rigorous treatment of the foundations of stochastic control; a unified approach to filtering, estimation, prediction, and stochastic and adaptive control; and the conceptual framework necessary to understand current trends in stochastic control, data mining, machine learning, and robotics.

**Rollout, Policy Iteration, and Distributed Reinforcement Learning** - Dimitri Bertsekas - 2021-08-20

The purpose of this book is to develop in greater depth some of the methods from the author's
reinforcement learning methods. In this book, recently published textbook (Athena Scientific, 2019). In particular, we present new research, relating to systems involving multiple agents, partitioned architectures, and distributed asynchronous computation. We pay special attention to the contexts of dynamic programming/policy iteration and control theory/model predictive control. We also discuss in some detail the application of the methodology to challenging discrete/combinatorial optimization problems, such as routing, scheduling, assignment, and mixed integer programming, including the use of neural network approximations within these contexts. The book focuses on the fundamental idea of policy iteration, i.e., start from some policy, and successively generate one or more improved policies. If just one improved policy is generated, this is called rollout, which, based on broad and consistent computational experience, appears to be one of the most versatile and reliable of all rollout algorithms are developed for both discrete deterministic and stochastic DP problems, and the development of distributed implementations in both multiagent and multiprocessor settings, aiming to take advantage of parallelism. Approximate policy iteration is more ambitious than rollout, but it is a strictly off-line method, and it is generally far more computationally intensive. This motivates the use of parallel and distributed computation. One of the purposes of the monograph is to discuss distributed (possibly asynchronous) methods that relate to rollout and policy iteration, both in the context of an exact and an approximate implementation involving neural networks or other approximation architectures. Much of the new research is inspired by the remarkable AlphaZero chess program, where policy iteration, value and policy networks, approximate lookahead minimization, and parallel computation all play an important role.
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The purpose of this book is to develop in greater depth some of the methods from the author's Reinforcement Learning and Optimal Control recently published textbook (Athena Scientific, 2019). In particular, we present new research, relating to systems involving multiple agents, partitioned architectures, and distributed asynchronous computation. We pay special attention to the contexts of dynamic programming/policy iteration and control theory/model predictive control. We also discuss in some detail the application of the methodology to challenging discrete/combinatorial optimization problems, such as routing, scheduling, assignment, and mixed integer programming, including the use of neural network approximations within these contexts. The book focuses on the fundamental idea of policy iteration, i.e., start from some policy, and
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Deterministic and Stochastic Optimal Control - Wendell H. Fleming - 2012-12-06
This book may be regarded as consisting of two parts. In Chapters I-IV we present what we regard as essential topics in an introduction to deterministic optimal control theory. This material has been used by the authors for one semester graduate-level courses at Brown University and the University of Kentucky. The simplest problem in calculus of variations is taken as the point of departure, in Chapter I. Chapters II, III, and IV deal with necessary conditions for an optimum, existence and regularity theorems for optimal controls, and the method of dynamic programming. The beginning reader may find it useful first to learn the main results, corollaries, and examples. These tend to have deliberately postponed some difficult technical proofs to later parts of these chapters. In the second part of the book we give an introduction to stochastic optimal control for Markov diffusion processes. Our treatment follows the dynamic programming method, and depends on the intimate relationship between second order partial differential equations of parabolic type and stochastic differential equations. This relationship is reviewed in Chapter V, which may be read independently of Chapters I-IV. Chapter VI is based to a considerable extent on the authors' work in stochastic control since 1961. It also includes two other topics important for applications, namely, the solution to the stochastic linear regulator and the separation principle.

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**Stochastic Control in Discrete and Continuous Time** - Atle Seierstad - 2010-07-03
This book contains an introduction to three topics in stochastic control: discrete time stochastic control, i.e., stochastic dynamic programming (Chapter 1), piecewise-terministic control problems (Chapter 3), and control of Itô diffusions (Chapter 4). The chapters include treatments of optimal stopping problems. An Appendix - calls material from elementary probability theory and gives heuristic explanations of certain more advanced tools in probability theory. The book will hopefully be of
Continuous Time - Atle Seierstad - 2010-07-03

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Numerical Methods for Stochastic Control Problems in Continuous Time

Stochastic control is a very active area of research. This monograph, written by two leading authorities in the field, has been updated to reflect the latest developments. It covers effective numerical methods for stochastic control problems in continuous time on two levels, that of practice and that of mathematical development. It is broadly accessible for graduate students and researchers.

Stochastic Control of Partially Observable Systems

Stochastic Control of Partially Observable Systems - Alain Bensoussan - 2004-11-11
The problem of stochastic control of partially observable systems plays an important role in many applications. All real problems are in fact of this type, and deterministic control as well as stochastic control with full observation can only be approximations to the real world. This justifies
the nonlinear filtering theory, in which the possible, which can be used for numerical implementation. This book first presents those problems under the linear theory that may be dealt with algebraically. Later chapters discuss the nonlinear filtering theory, in which the statistics are infinite dimensional and thus, approximations and perturbation methods are developed.

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**Controlled Markov Processes and Viscosity Solutions** - Wendell H. Fleming - 2006-02-04
This book is an introduction to optimal stochastic control for continuous time Markov processes and the theory of viscosity solutions. It covers dynamic programming for deterministic optimal control problems, as well as to the corresponding theory of viscosity solutions. New chapters in this second edition introduce the role of stochastic optimal control in portfolio optimization and in pricing derivatives in incomplete markets and two-controller, zero-sum differential games.
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**Discrete-Time Stochastic Control and Dynamic Potential Games** - David González-Sánchez - 2013-09-20

There are several techniques to study noncooperative dynamic games, such as dynamic programming and the maximum principle (also called the Lagrange method). It turns out, however, that one way to characterize dynamic potential games requires to analyze inverse optimal control problems, and it is here where the Euler equation approach comes in because it is particularly well-suited to solve inverse problems. Despite the importance of dynamic potential games, there is no systematic study about them. This monograph is the first attempt to provide a systematic, self-contained presentation of stochastic dynamic potential games.

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massive introduction of renewable energies in *Constrained Stochastic Control* - Richard C. Chen - 2000

**Dynamic Programming Equations for Constrained Stochastic Control** - Richard C. Chen - 2000

**Approximate Dynamic Programming** - Warren B. Powell - 2007-10-05

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**Stochastic Multi-Stage Optimization** - Pierre Carpentier - 2015-05-05

The focus of the present volume is stochastic optimization of dynamical systems in discrete time where - by concentrating on the role of information regarding optimization problems - it discusses the related discretization issues. There is a growing need to tackle uncertainty in applications of optimization. For example the massive introduction of renewable energies in power systems challenges traditional ways to manage them. This book lays out basic and advanced tools to handle and numerically solve such problems and thereby is building a bridge between Stochastic Programming and Stochastic Control. It is intended for graduates readers and scholars in optimization or stochastic control, as well as engineers with a background in applied mathematics.

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**Computational Dynamic Programming for Stochastic Optimal Control on a Vector Multiprocessor** - Floyd B. Hanson - 1988

**Stochastic Control of Hereditary Systems and Applications** - Mou-Hsiung Chang - 2008-01-03

This monograph develops the Hamilton-Jacobi-Bellman theory via dynamic programming principle for a class of optimal control problems for stochastic hereditary differential equations (SHDEs) driven by a standard Brownian motion and with a bounded or an infinite but fading memory. These equations represent a class of stochastic infinite-dimensional systems that become increasingly important and have wide range of applications in physics, chemistry, biology, engineering and economics/finance. This monograph can be used as a reference for those who have special interest in optimal control theory and applications of stochastic hereditary systems.
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**Lectures on BSDEs, Stochastic Control, and Stochastic Differential Games with Financial Applications** - Rene Carmona - 2016-02-18

The goal of this textbook is to introduce students to the stochastic analysis tools that play an increasing role in the probabilistic approach to optimization problems, including stochastic control and stochastic differential games. While optimal control is taught in many graduate programs in applied mathematics and operations research, the author was intrigued by the lack of coverage of the theory of stochastic differential games. This is the first title in SIAM?s Financial Mathematics book series and is based on the author?s lecture notes. It will be helpful to differential equations (forward, backward, forward-backward); the probabilistic approach to stochastic control (dynamic programming and the stochastic maximum principle); and mean field games and control of McKean-Vlasov dynamics. The theory is illustrated by applications to models of systemic risk, macroeconomic growth, flocking/schooling, crowd behavior, and predatory trading, among others.

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applications to models of systemic risk,
macroeconomic growth, flocking/schooling,
crowd behavior, and predatory trading, among
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**Dynamic Management Decision and Stochastic Control Processes** - Toshio Odanaka - 1990
This book treats stochastic control theory and its
applications in management. The main numerical
techniques necessary for such applications are
presented. Several advanced topics leading to
optimal processes are dismissed. The book also
considers the theory of some stochastic control
processes and several applications to illustrate
the ideas.

**Optimization of Stochastic Discrete Systems and Control on Complex Networks** - Dmitrii Lozovanu - 2014-11-27
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This book presents the latest findings on stochastic dynamic programming models and on solving optimal control problems in networks. It includes the authors’ new findings on determining the optimal solution of discrete optimal control problems in networks and on solving game variants of Markov decision problems in the context of computational networks. First, the book studies the finite state space of Markov processes and reviews the existing methods and algorithms for determining the main characteristics in Markov chains, before proposing new approaches based on dynamic programming and combinatorial methods. Chapter two is dedicated to infinite horizon stochastic discrete optimal control models and Markov decision problems with average and expected total discounted optimization criteria, while Chapter three develops a special game-theoretical approach to Markov decision processes and stochastic discrete optimal control problems. In closing, the book’s final chapter is devoted to finite horizon stochastic control problems and Markov decision processes. The algorithms developed represent a valuable contribution to the important field of computational network theory.
solution of the associated Hamilton-Jacobi-Bellman equation; they also study the structure of the optimal strategies and show how to find them. The viscosity approach was widely used in control problems related to mathematical finance but until quite recently it was not used to solve control problems related to actuarial mathematical science. This book is designed to familiarize the reader on how to use this approach. The intended audience is graduate students as well as researchers in this area.

Stochastic Optimization in Insurance - Pablo Azcue - 2014-06-19
The main purpose of the book is to show how a viscosity approach can be used to tackle control problems in insurance. The problems covered are the maximization of survival probability as well as the maximization of dividends in the classical collective risk model. The authors consider the possibility of controlling the risk process by reinsurance as well as by investments. They show that optimal value functions are characterized as either the unique or the smallest viscosity
solution of the associated Hamilton-Jacobi-Bellman equation; they also study the structure of the optimal strategies and show how to find them. The viscosity approach was widely used in control problems related to mathematical finance but until quite recently it was not used to solve control problems related to actuarial mathematical science. This book is designed to familiarize the reader on how to use this approach. The intended audience is graduate students as well as researchers in this area.
